

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior revisions, and listings, of claims in the application.

1. (Currently amended) A method of fabricating a component having internal teeth such as a multiple disc clutch drum or an internal gear, comprising the steps of:

inserting a cylindrical material for forming a component having internal teeth into a rotatably driven container in an approximately aligned manner;

placing said container through a radial bearing on a base;

rotatably driving a rolling tool having external teeth to be pressed against an inner side of said cylindrical material to fabricate an inner teeth by rolling and a rolling tool rotational shaft rotatably driving said rolling tool;

pressing and deforming the cylindrical material between an outer circumference of ~~[[a]]~~ said rolling tool and an inner circumference of said container ~~while sequentially changing a distance between a rotatably driving rolling tool rotational shaft and a container rotational axis to successively grow a tooth profile while changing by force a center distance between said rolling tool rotational shaft and a rotational axis of said container by relatively moving said rolling tool rotational shaft by force as the external teeth of said rotatably driving rolling tool rotational shaft are being pressed against an inner face of said cylindrical material; [[and]]~~

completing rolling in a state where the cylindrical material fills said container as a result of an enlarged outer diameter by spreading; and

discharging a processed component having internal teeth from said container.

2. (Currently Amended) The method of fabricating ~~[[a]]~~ the component having internal teeth such as the multiple disc clutch drum or the internal gear according to claim 1, further

comprising a step of:

providing in advance a same number of concave grooves as that of internal teeth to be formed on an inner circumferential surface of [[the]] said cylindrical material at equal intervals.

3. (Currently Amended) A rolling machine for fabricating a component having internal teeth such as a multiple disc clutch drum or an internal gear comprising:

a rotatably driven container into which a cylindrical material for forming a component having internal teeth is inserted in an aligned manner;

a base on which said container is placed through a radial bearing;

a rolling tool having external teeth pressed against an inner side of said cylindrical material to fabricate the internal teeth by rolling;

a rolling tool rotational shaft rotatably driving said rolling tool; [[and]]

a slider fitting said rolling tool rotational shaft into a rolling tool bearing; and

a transfer mechanism forcibly moving said rolling tool rotational shaft to forcibly change a distance between a rotational axis of said container and said rolling tool rotational shaft and moving the rotation axis of said container by relatively moving said slider by force while said rolling tool rotational shaft is driven.

4. (Currently Amended) A rolling machine for fabricating a component having internal teeth such as a multiple disc clutch drum or an internal gear comprising:

a rotatably driven container into which a cylindrical material for forming [[a]] the component having internal teeth is inserted in an aligned manner;

a base on which said container is placed through a radial bearing;

a rolling tool having external teeth pressed against an inner side of said cylindrical material to fabricate the internal teeth by rolling;

a rolling tool rotational shaft rotatably driving said rolling tool;

a slider fitting said rolling tool rotational shaft into a rolling tool bearing;

a transfer mechanism forcibly moving said rolling tool rotational shaft to forcibly change a distance between a rotational axis of said container and said rolling tool rotational shaft and moving the rotation axis of said container by relatively moving said slider by force while said rolling tool rotational shaft is driven; and

a vertical expansion shaft performing either one of changing and toughly keeping an axial position of said container with respect to a position of the tool.

5. (Currently Amended) The rolling machine for fabricating the component having internal teeth such as the multiple disc clutch drum or the internal gear according to claim 4, wherein

said vertical expansion shaft includes at least two numerical control shafts.

6. (Currently Amended) The rolling machine for fabricating the component having internal teeth such as the multiple disc clutch drum or the internal gear according to claim 4, wherein

said vertical expansion shaft includes three independent numerical control shafts arranged in parallel at three points surrounding the container rotational axis.

7. (Currently Amended) The rolling machine for fabricating the component having internal teeth such as the multiple disc clutch drum or the internal gear according to claim 4, wherein

said vertical expansion shaft inserts and fits an outer circumference of the container filled with said cylindrical material into an inner side of the radial bearing placed at the base each time rolling processing starts, and disengages the container and the radial bearing from each other after termination of the rolling processing to discharge a processed product and to insert another cylindrical material.

8. (Currently Amended) The rolling machine for fabricating the component having internal

teeth such as the multiple disc clutch drum or the internal gear according to claim 4, wherein

said transfer mechanism includes a purchase wedge pressing a slider connected to the rolling tool rotational shaft and a spring pushing back the slider, the transfer mechanism controlling a position of said slider by feeding back data of a distance sensor directly monitoring the position of said slider.

9. (New) A rolling machine comprising:

a rotatably driven container into which a cylindrical material for forming a component having internal teeth is inserted in an aligned manner;

a base on which said container is placed through a radial bearing;

a rolling tool having external teeth pressed against an inner side of said cylindrical material to fabricate the internal teeth by rolling;

a rolling tool rotational shaft rotatably driving said rolling tool;

a transfer mechanism forcibly moving said rolling tool rotational shaft to forcibly change a distance between a rotational axis of said container and said rolling tool rotational shaft; and

a vertical expansion shaft performing either one of changing and roughly keeping an axial position of said container with respect to a position of the tool, wherein

said vertical expansion shaft includes at least two numerical control shafts.

10. (New) A rolling machine comprising:

a rotatably driven container into which a cylindrical material for forming a component having internal teeth is inserted in an aligned manner;

a base on which said container is placed through a radial bearing;

a rolling tool having external teeth pressed against an inner side of said cylindrical material to fabricate the internal teeth by rolling;

a rolling tool rotational shaft rotatably driving said rolling tool;  
a transfer mechanism forcibly moving said rolling tool rotational shaft to forcibly change a distance between a rotational axis of said container and said rolling tool rotational shaft; and  
a vertical expansion shaft performing either one of changing and toughly keeping an axial position of said container with respect to a position of the tool, wherein  
said vertical expansion shaft includes three independent numerical control shafts arranged in parallel at three points surrounding the container rotational axis.

11. (New) A rolling machine comprising;

a rotatably driven container into which a cylindrical material for forming a component having internal teeth is inserted in an aligned manner;

a base on which said container is placed through a radial bearing;

a rolling tool having external teeth pressed against an inner side of said cylindrical material to fabricate the internal teeth by rolling;

a rolling tool rotational shaft rotatably driving said rolling tool;

a transfer mechanism forcibly moving said rolling tool rotational shaft to forcibly change a distance between a rotational axis of said container and said rolling tool rotational shaft; and

a vertical expansion shaft performing either one of changing and toughly keeping an axial position of said container with respect to a position of the tool, wherein

said transfer mechanism includes a purchase wedge pressing a slider connected to the rolling tool rotational shaft and a spring pushing back the slider, the transfer mechanism controlling a position of said slider by feeding back data of a distance sensor directly monitoring the position of said slider.